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Learning by Doing in Architectural Education: From Urban Design to Architectural Design, Yenikapı-İnebey Case Study

Yasemin Erkan Yazıcı [1], Evrim Töre [2]

Abstract

This paper reports a 2 semester study conducted with 74 undergraduate students of Architecture at the Istanbul Kültür University to investigate the extent of architectural design students' use of urban design information in their projects by learning by doing method. In the first semester, students performed a comprehensive analysis of the Yenikapı-İnebey Quarter of Istanbul in terms of urban design criteria. In the second semester, students were given the task of creating a massing study of an architectural design project which was not constrained in terms of function, hmax or building coefficient, near the project site. This was followed by an open ended question to identify the criteria which influenced the designs of the students. The results of the research reveal that, in terms of learning by doing method, the students are competent to carry the knowledge and aspects of urban design to the lower scales of design.

Keywords

Design education
Learning by doing
Urban design
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Yenikapı

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Introduction

Although its origin can be based on the need to humanize the city which was emphasized in Sitte's *City Planning According to Artistic Principles* dated 1889 (Collins and Collins, 2006), urban design emerged as a special field in the 1930s when urban planning in growing industrial cities started to pay more attention to the social dimension of the city and became less concerned with the spatial structure. This shift created a space between urban planning and architecture and resulted in the emergence of urban design in this space.

In other words, urban design was born when urban planning and architecture retreated to their own defined areas of scale. However, current debate emphasizes the need for urban design to be strongly linked to both urban planning and architecture. For instance, Cassia (2005) states that even though designing cities is an act of architecture, architectural design does not respond to this structuring. He talks about an idea of a city which is connected to urban material and context and underlines the fact that the only way to reach this goal is through urban design which he defines beyond urban planning and architecture. Similarly, Moughtin and Shirley (2005) point at sustainable development and highlight that this kind of a multi-parameter process can only be delivered in urban design agenda. In light of this debate, urban design today is defined as the art of city building, a bridge between planning and architecture or a sister art of architecture (Moughtin et. al., 1999;

[1] Istanbul Kultur University, Faculty of Architecture, Department of Architecture, Turkey, y.erkanyazici@iku.edu.tr
[2] Istanbul Kultur University, Faculty of Architecture, Department of Architecture, Turkey, e.tore@iku.edu.tr

Moughtin and Shirley, 2005), and continues to evolve as an autonomous field to which landscape architects and civil engineers contribute as well as planners and architects (Lang, 2005).

Nowadays, plot-based intervention is gradually decreasing and being replaced by large scale massive structures. Taking into account the fact that the line between large scale architectural design and urban design is very much blurred (Lang, 2005), urban planning which has had a role in making decisions at the higher scale and architecture which has been active in implementation are clearly called into duty, to play their own roles as defined. The change in the approach to development which is directly linked to socio-political and economical dynamics in cities causes the impacts of architectural intervention increase and deepens. This approach establishes the expectation and need for environmental data underlined by urban design to come to the forefront in architectural design. Producing context sensitive, high quality projects with a larger and more comprehensive perspective (Erten vd. 2005) requires the role of urban design to be handled carefully.

In architectural education, one-on-one learning and learning by doing are essential. Thus Chikering (1987) states that the form of education where students just sit in the classroom listening to the teacher and reply by memorizing the given information is not successful. Active learning processes where students are in the centre of the learning process can produce positive results aside from the difficulties in implementation (Keyser, 2000). A number of various methods, strategies and material based on the level, objectives and subject of the lesson can be used in the process (Karakaya, 1997; Keyser, 2000). Research conducted at various levels and fields have established that the personal involvement of students in learning processes increases their success (Kimonen and Nevalainen, 2005; Pratton and Hales, 1986; Ransdell and Gaillard-Kenney, 2009; Prince, 2004; Felder and Brent, 2003). In this context, according to John Dewey's thesis "learning by doing" in his book titled *Schools of Tomorrow* (1915), using learning by doing process wherever possible is an important method in raising students' attention and interest (UPDL, 2013).

Learning by doing requires critical and creative thinking, problem solving, having access to, using and sharing information (Korkmaz, 2002). According to Schank (1995), learning by doing is a way of making learning easier and all learning processes should be seen, felt and done as they would be in real life.

During architectural education, it enables every student to consolidate information by implementing it. In architecture, the process is as important as the end product. The process and the outcome vary according to the environment where the person works, his/her cognitive structure, social and cultural conditions etc. (Kırışoğlu, 2009).

Architectural design studio which is the backbone of architectural education is a student-centred environment where learning by doing happens (Solomon, 2004). Projects which have an educative dimension since they support students learn by doing, enable both individual and group work and also assess the relationship between thought and action (Goldman, 2002).

Architecture students at first generally approach the subject at the higher scale and then focus on architectural design field. In this process, while links are established between higher and lower scales, mostly a lot of data is disregarded. Difficulties are experienced in reflecting the criteria analysed at the higher scale including spatial figure-ground analysis, geo-morphological structure, topography, transportation, impact on the silhouette, people/vehicle movement onto design because of form-related concerns at the lower scale (Erten et al., 2005). Thus, context free designs that concern only with the form are created.

In this article, this problem reflected in design is analysed in terms of process and method of education. To what extent architecture students use the basic urban design information acquired via learning by doing method in theory and implementation in architectural design level; which environmental data come to the forefront or fall behind in architectural design level constitute the article's research questions. Researchers discuss these questions via a student study they conducted in Yenikapı-İnebey Neighbourhoods.

Method

Research Type

This article establishes and discusses the extent to which data at the urban level can be carried to architectural design via a study done in Yenikapı-İnebey Neighbourhood by architecture students. Therefore, it is targeted to establish an existing situation and a definitve research.

The Universe and the Sample of the Research

Istanbul Kültür University, Department of Architecture students form the universe of the research. Students who participated in urban design analysis work in titled Principles of Urban Design lecture in 2011-12 spring semester were selected. The sample of the research is 74 students in total.

Data Collection Tools

The research has been conducted in four stages by two academicians, one of whom is an architect and the other is a planner-urban designer. In the first stage, 4th year students of the mandatory lecture titled Principles of Urban Design in 2011-12 spring semester were asked to analyse the 14 building blocks in Yenikapı –İnebey Neighbourhood and their surroundings.

In the second stage in 2012-13 autumn semester, an adjacent project area to the former one was selected. Students who participated in the former analysis stage were asked to place an architectural project with a theme of their choice at 1:200 scales as a mass in this area.

In the third stage, in order to make the design process clearer for the students, an open-ended research question regarding the criteria which was guiding architectural design was asked. Ultimately, the parameters used for valuation and evaluation in education can be considered as data sources for quantitative research (Mamur, 2012); data can be collected via observation, interview, questionnaires and document review (Yıldırım and Şimşek, 2005). The question was as follows.

"Explain the criteria you took into account while you were designing (such as forming the building, placing on the project area, relationship between open/closed spaces, impact on silhueette) in bullet points."

In the final stage, the designs by the students were reviewed and the urban design analysis criteria which guided the students' projects were identified. At this analysis and evaluation stage, the researchers drew on Ching (2010), Rigolon (2010), Bacon (1995) and Onat's (1995) categorisations to identify the criteria used and Keleş's (1994) work to categorise the findings. At this stage, the seven criteria identified by the researchers and related to urban design decisions were as follows: form of the building/building complex, building use, access direction to the building plot, ground coverage of the buildings, number of storeys, horizontal-vertical placing on the building plot and orientation to the sea.

Data Analysis

The project area selected for the first stage is located in Istanbul in Historical Peninsula. It is adjacent to a very important axis where Vatan and Millet Streets intersect and which flows from Aksaray to Yenikapı, again a very important transfer hub (Figure 1). The area is also in an adjacent parcel to the Yenikapı Excavation Area. A museum archeo-park is going to be designed in this area according to Yenikapı Urban Design Competition. Moreover, this area has become a transfer point to enable Yenikapı to become a strong transfer hub.

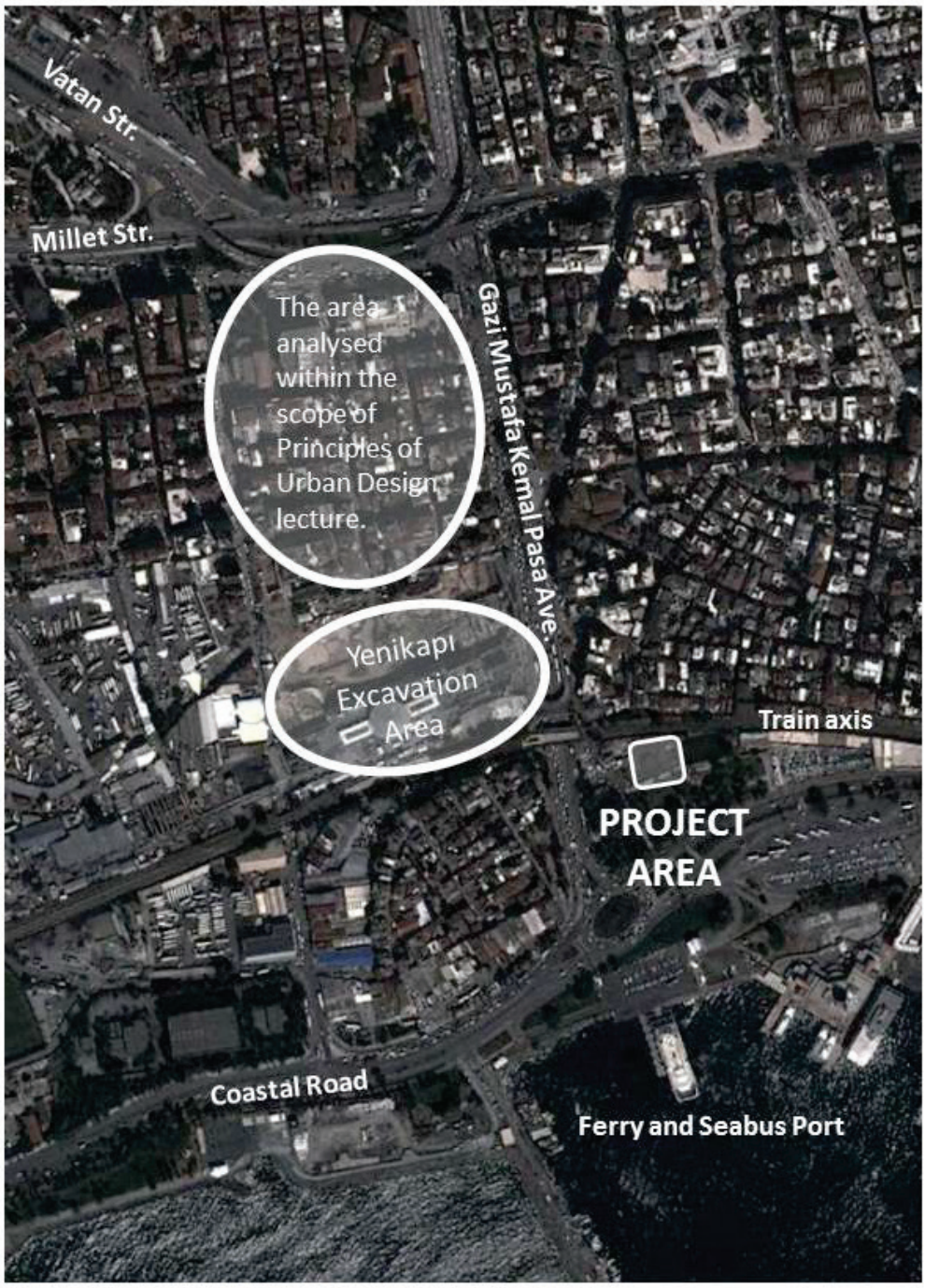


Figure 1. Site Analysis Map

At this stage, students were led to analyse this area in groups and according to the given criteria (Table 1). These criteria basically included analysis of the area in its surroundings and area specific analysis. What is expected from higher level analysis which include basic categories such as socio-economic data, road and access analysis, slope analysis, environment quality analysis and current projects is to help students to assess not only their given project area but also the urban relationships by enabling them to take into account their project area's surroundings as well.

Awareness about the surroundings of the project area and urban relationships were raised by the aforementioned high level analysis. The five fundamental elements used by Lynch (1960) to make the city legible; namely paths, districts, edges, nodes and landmarks and principles from Cullen's

(1961) townscape analysis were added to urban design analysis under the analysis of the area in its surroundings and were included in the issues to be identified.

Table 1. Urban Design Analysis Criteria

A) ANALYSIS OF THE AREA IN ITS SURROUNDINGS	B) AREA SPECIFIC ANALYSIS (including the adjacent building plots)
1. Location of the area in Istanbul, in its District and in its immediate surrounding 2. Basic information about the area (Identity of the Area) ▪ History of the area ▪ Socio-economic structure, cultural structure ▪ …. 3. Road and Access Analysis ▪ E-5 Motorway, TEM (if exists) ▪ 1st, 2nd, 3rd.. degree roads (based on traffic load) ▪ Traffic movement direction ▪ Public transport axis (routes) and stops ▪ Bridge, viaduct, tunnel ▪ Planned parking places ▪ Bus terminal ▪ Intersection structure ▪ Pedestrian routes 4. Slope Analysis and street sections from important places 5. Area model and sections, sketches from important points 6. Environmental Characteristics Data ▪ Silhuoette ▪ Edges (impermeable, semi-permeable, permeable) (LYNCH ANALYSIS) ▪ Nodes (LYNCH ANALYSIS) ▪ Landmarks (LYNCH ANALYSIS) ▪ Districts (LYNCH ANALYSIS) ▪ Important vista points (CULLEN ANALYSIS) ▪ Cul-de-sacs (CULLEN ANALYSIS) ▪ Stairs, pedestrian routes (CULLEN ANALYSIS) ▪ Noise / noise prevention ▪ Urban green open spaces ▪ Traffic / vehicle density / unplanned car parking areas ▪ Building facades 7. Existing plan desicions related to the area and current projects	1. Figure-ground analysis 2. Building stock (individual building / perimeter block) 3. Number of storeys and building height analysis *Note: Extra-ordinary situations will also be noted.* 4. Construction structure analysis ▪ Masonry (Stone/brick) (if exists, timber or sun-dried brick) ▪ Frame (reinforced concrete/timber/steel) ▪ Mixed ▪ Shack ▪ Unknown 5. Structural condition analysis ▪ Good (good structure + good material) ▪ Medium (good structure + medium material) ▪ Bad (medium structure + poor material) ▪ Dilapidated (poor structure + poor material) ▪ Under construction 6. Building use ▪ Residential • Sports ▪ Commercial • Religious ▪ Services • Industrial ▪ Administrative • Cultural ▪ Education • Car parks ▪ Park-garden • Vacant 7. Ground floor – street relationship ▪ Set back buildings ▪ High entrance buildings / Low entrance buildings ▪ Entrances with stairs / level entrances ▪ …. 8. Listed buildings 9. Tenure structure

The project area selected in the second stage (Figure 2) is 1500 m2 wide and is located within the park across Yenikapı Ferry Station. The building parcel is enclosed by the park in the south and east, the railway in the north on a higher level and it has access from Aksaray-Yenikapı main axis in the west. Students who participated in the first analysis stage were asked to design an architectural project with a theme of their choice at 1:200 scales as a mass in this area. The building use, plot ratio and building height was not limited in the project area. At this stage, students were given base maps at 1:5000 and 1:1000 scales, aerial photograph of the area and the site analysis map in Figure 1 and were reminded that the building blocks just in the north and south of the railway had 3 storeys in average, building blocks further north have 7 storeys in average and that these buildings mainly had residential and commercial uses.

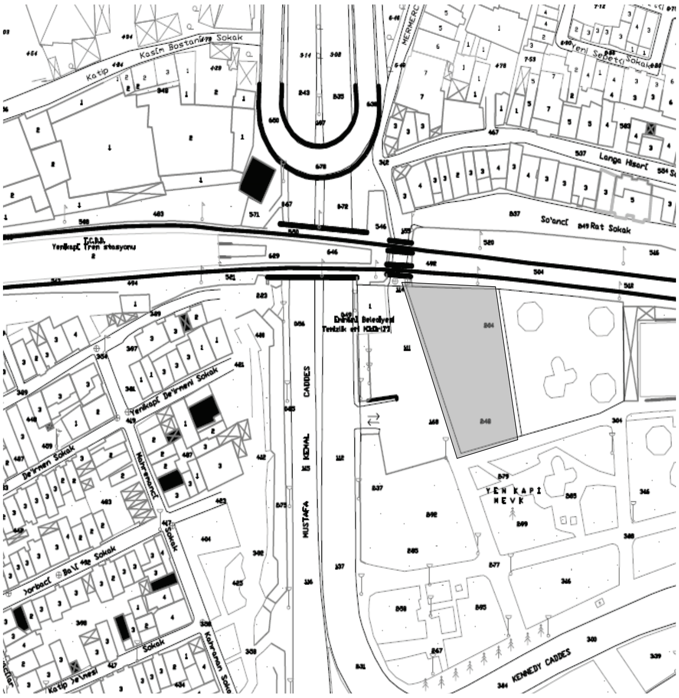


Figure 2. Project Area (marked in grey)

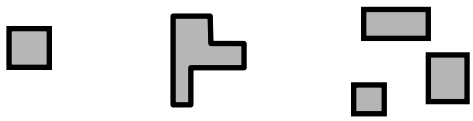
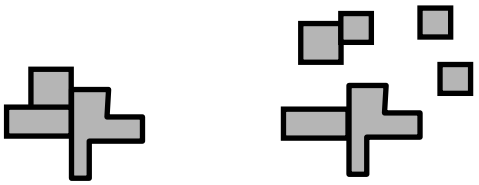
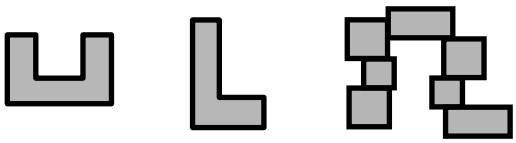
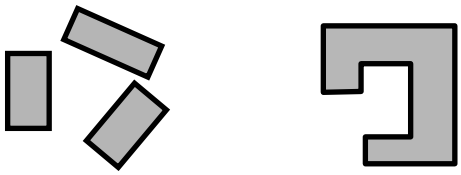
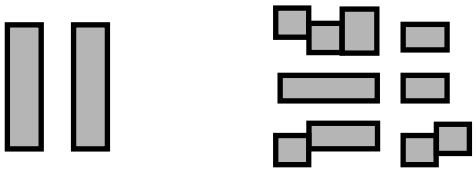
Student responses to the question posed at the third stage at architectural design and urban design levels are grouped under general headings. Based on the research question, urban design criteria that guided architectural design were taken into account. Commonly used urban design criteria were identified and linked to Table 1.

At the end of all stages, student designs were reviewed and researchers tried to determine which of the criteria for urban design analysis guided students' projects. Forms created while bringing together spaces, subject, building programme, project area related data, interaction with the surroundings, access, orientation, the programme of the designer, evaluation of the surroundings and the project area by the designer are shaped by various factors (Onat, 1995). At this analysis and evaluation stage, the researchers drew on Ching, Onat, Rigolon and Bacon's categorisation in identifying the criteria used which are listed in Table 2.

Ching (2010) deals with the forms which are created while bringing together spaces as central, linear, radial, clustered and gridal while Onat (1995) deals with them as point, clustered, linear, spiral, radial, branched and gridal. Rigolon's (2010) work is important in the search for pattern in multiple buildings (such as block plan, cluster plan, courtyard plan). Bacon's (1995) four-piered structure regarding one's perception of space – unity, duality, dominance-subdominance, endotopic-exotopic-was re-assessed and included in the study framework. This re-assessment was used in formally analysing the building/building complex.

Projects designed by 74 students were grouped under 6 different forms, namely point, cluster, U/L type, closed courtyard, open courtyard and linear (Table 2). Some designs had characteristics of more than one group. In those instances, designs were considered under the form which was dominant. Designs which had point and cluster forms had mostly an individual characteristic. However in U/L type, close courtyard, open courtyard and linear forms, there was an effort to create a pattern.

Table 2. Categorisation of Designs Based on Their Forms

Group	Form Alternatives	Explanation
Point		Arrangements where a single block or separate blocks are dominants and which has a point character in terms of location.
Cluster		Arrangements where generally more than one form are gathered together to create a sense of grouping rather than a dominant single block.
U/L type		Arrangements where one block or a number of blocks are gathered together to create a U/L shape. They have a courtyard with one open side. They show efforts for creating a pattern. There is a search for internal-external space.
Closed Courtyard		Arrangements where a single block or a group of blocks were gathered together to create a courtyard shape. Blocks are placed to enclose the space in the middle. They show efforts for creating a pattern. There is a search for internal-external space.
Open Courtyard		Arrangement where a single block or a group of blocks are gathered together to create a sense of square in the centre. They show efforts for creating a pattern. There is a search for internal-external space.
Linear		Arrangements where blocks are gathered to create a linear pattern. This arrangement can be created either through replicating the same form or through replicating different forms in a specific order. They show efforts for creating a pattern. There is a search for internal-external space.

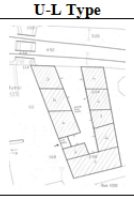
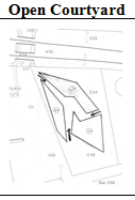
The ground coverage of the designs are categorised as "integration" in 100 % - 81 % dispersal, "building-dominated" in 80 %-56 % dispersion, "balance" in 55 %-40 %, "open space-dominated" in 39 %-1 %.

Keleş's work (1994) was helpful in grouping the findings. Keleş, deals with settlement area, building-settlement area relationship, general characteristics of the buildings and characteristics of the parts and thus establishes a significant basis for systematizing building-based analysis. In this study, groups listed in Table 3 were created in light of the issues pointed out in the aforementioned work. At this stage, the seven criteria identified by the researchers and which were related to urban design decisions were as follows: form of the building/building complex (design), building use, access direction to the building plot, ground coverage of the buildings, number of storeys, horizontal-vertical placing on the building plot and orientation the sea.

Findings

Designs were examined in terms of form of the building/building complex, building use, access direction to the building plot, ground coverage of the buildings, number of storeys, horizontal-vertical placing on the building plot and orientation to the sea. In Table 3, 6 examples, one from each group, are illustrated.

Table 3. Review of Designs

Group	Point	Cluster	U-L Type	Closed Courtyard	Open Courtyard	Linear
Design						
						
Building Use	Housing	Hotel	Office	Cultural Centre	Office	Museum
Access direction	Undefined	North 1 West 2	North 1 West 1	West 1 East 1	Northwest 1 East 1 South 1	North 1 West 3 East 3 South 1
Ground coverage of the buildings (%)	40	30	75	75	40	70
Number of storeys	4 and 5	3, 6 and 7	2,3,4 and 5	3	1 and 2	1
Vertical-horizontal	Horizontal	Vertical	Horizontal	Horizontal	Horizontal	Horizontal
Orientation to the sea	Perpendicular and parallel	Perpendicular	Perpendicular	Perpendicular	Perpendicular and parallel	Perpendicular and parallel

When student designs were examined, it was established that 42 % created point, 27 % created clusters, 8 % created U/L type, 3 % created closed courtyards, 12 % created open courtyards and 8 % created linear forms (Figure 3).

The uses in the designs consist of 8 groups based on percentage. Cultural centres are in the first place by 39 %, followed by 22 % offices, 18 % hotels, 5 % housing, 5 % museums, 3 % workshops, 3 % health facilities and the remaining are shopping centres, youth centres, wedding halls and social centres (Figure 4).

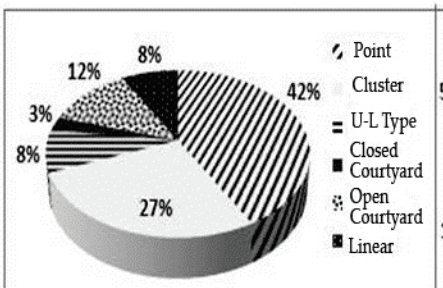


Figure 3. Distribution of designs based on form

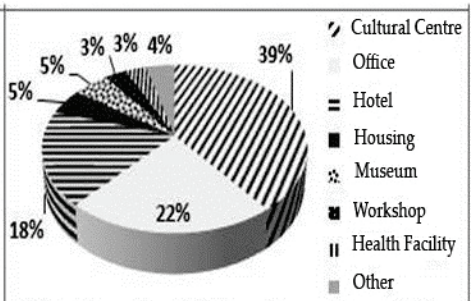


Figure 4. Distribution of designs based on building use

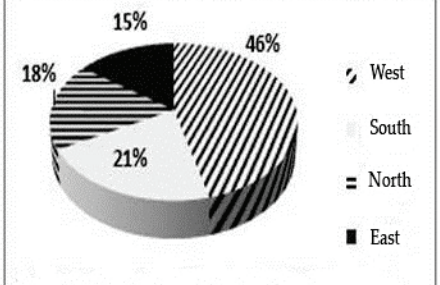


Figure 5. Distribution of designs based on access to the building plot

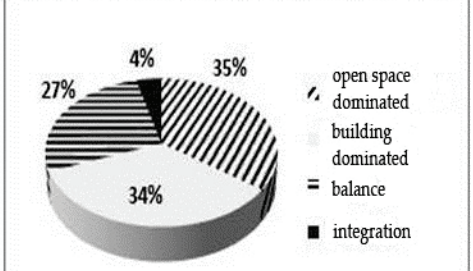


Figure 6. Distribution of designs based on ground coverage of the buildings

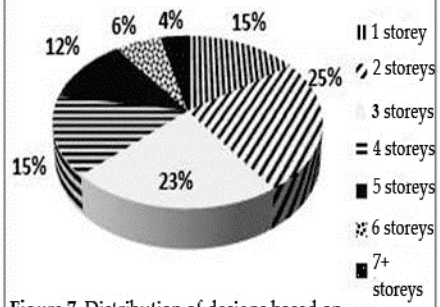


Figure 7. Distribution of designs based on building height

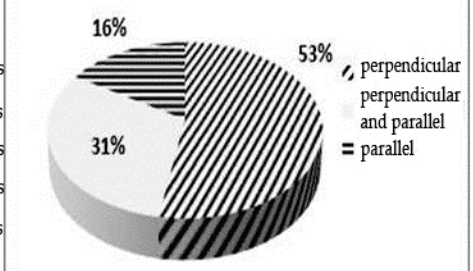


Figure 8. Distribution of designs based on orientation to the sea

When reviewed in terms of access direction to the building plot, it was established that 14 out of 74 students did not indicate an access for the design area. The other 60 students had more than one access to the building plot and by 46 % western access was selected. Eastern and southern accesses were selected by 15 % and 21 % respectively; northern access was preferred by 18 % (Figure 5).

When ground coverage of the design is analysed, integrated designs make up for 4 % of the total designs, balanced projects make up for 27 %, building-dominant projects make up for 34 % and open space-dominant projects make up for 35 % (Figure 6).

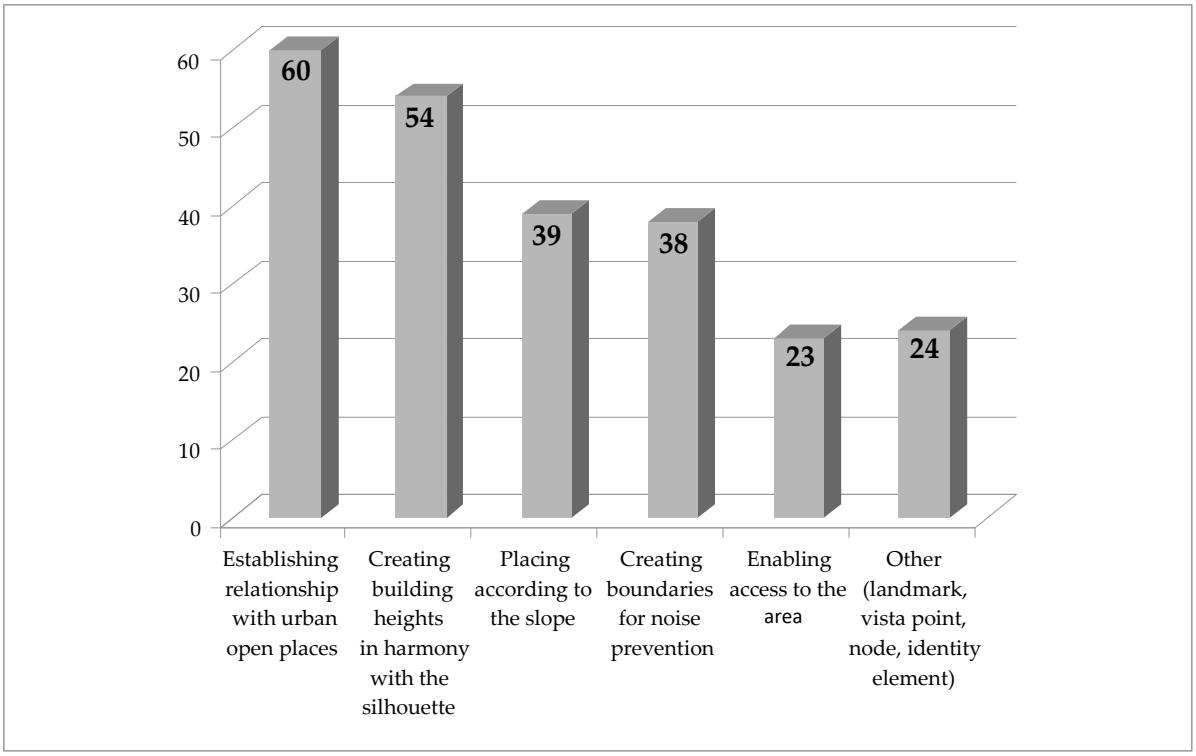
When evaluated together with building use, office buildings are found to be mostly in integrated and building-dominated group, hotel buildings are in balanced and open space-dominated group. No meaningful results could be determined for other buildings.

Designs consist of 221 blocks with generally different building heights. When number of storeys of buildings are analysed separately, 34 blocks have 1 storey, 55 blocks have 2 storeys, 50 blocks have 3 storeys, 33 blocks have 4 storeys, 27 blocks have 5 storeys, 14 blocks have 6 storeys, 4 blocks have 7 storeys, 1 block has 8 storeys, 2 blocks have 9 storeys, 1 block has 10 storeys (Figure 7).

Designs are mainly formed by multiple blocks. When each block's orientation the sea is assessed, 53 % of the students placed their blocks perpendicular to the sea, 31 % placed them both perpendicular and parallel to the sea and 16 % placed them parallel to the sea (Figure 8).

As a response to the open ended question posed in the third stage, 60 % of the students stated that they aimed to establish relationship with urban open spaces, 54 % to create height harmonious with the silhouette, 39 % to place according to the slope, 38 % to create boundaries for noise prevention and 23 % to enable access to the project area. Other responses include creating landmarks, nodes and vista points and designs which are sensitive to the character of the area (Table 4).

Table 4. Urban Design Criteria which guided Students' Designs



Discussion and Conclusion

The four-staged field work in Yenikapı conducted with Istanbul Kültür University, Department of Architecture students was reviewed based on seven criteria; form of the building/building complex, building use, access direction to the building plot, ground coverage of the buildings, number of storeys, horizontal-vertical placing on the building plot and orientation the sea. The findings of this analysis, reviewed together with the open-ended question asked to the students, are listed below:

- Designs are mostly as points or clusters. Only 31 % of the designs were created in U/L type, closed courtyard, open courtyard or linear pattern. Based on this result, it can be argued that a significant number of designs show **no efforts for creating a pattern**.
- When we look at the use of buildings, cultural centres are the most preferred at 39 %, followed by offices (22 %). The results of the analysis done at the first stage established that there were mainly residential and commercial buildings in the surrounding area. Student designs emerged as consistent with this result and **cultural centres and offices** were designed based on the need for these uses in the area. Cultural buildings were considered suitable in light of the need in the area and the adjacent Yenikapı Excavation Area.
- The fact that 19 % of the students (14 students) did not show the access point to the project area is a noteworthy finding. It was observed that the rest of the students gave multiple accesses to the area and these accesses were mostly **from the west**. In these designs, students attempted to link the busy traffic axis from Aksaray down to Yenikapı with the pedestrian road between the axis and the project area. Northern accesses are important because of the existence of the railway that runs just north of the project area and the linkage with the

northern building blocks; southern accesses are important as they create linkage with the park in the south.

- When the ground coverage of designs are analysed, it was observed that projects with 80 % - 56 % and 39%-1% coverage were dominant. When the ratios were reviewed in terms of the balance between open and closed spaces, **building-dominant** and **open space-dominant** projects stood out. No distinct relationship between ground coverage and building use was determined.
- The findings about number of buildings, building heights, placing on the project area, and orientation to the sea in designs show the trend towards low-rise buildings placed horizontally in the project area, perpendicular to the sea. Results related to number of storeys display the main preference of 2-3 storey buildings. This trend can be taken as **a search for harmony** when data related to the surroundings are considered. In most of the designs, it was observed that the surrounding buildings and **the silhouette** were taken into account. Since the building plot has an open view to the sea, in most of the work, the buildings were placed perpendicular to the sea so that the sea view was not blocked. The aim to sustain **the relationship between the sea and the northern building blocks** was manifest in orientation to the sea as well as in building height.
- It was identified that the urban design issues that the students took into account in the design process coincided a great deal with the Urban Design Analysis Criteria listed in Table 1.
    - "**Linking with urban open spaces**": identifying open spaces and creating direct and indirect links with these areas in design, it is linked with the Environmental Characteristics Data listed in Column A, no.6.
    - "**Creating building height harmonious with the silhouette**": it is linked with the Environmental Characteristics Data listed in Column A, no.6. and Number of Storeys and Building Height Analysis Data listed in Column B no. 3.
    - "**Placing according to slope**": it is linked with Slope Analysis listed in Column A no. 4.
    - "**Creating boundaries for noise prevention**": it is linked with noise prevention and edges (Lynch Analysis) under Environmental Characteristics Data listed in Column A, no.6.
    - "**Enabling access to the area**": it is linked with Road and Access Analysis listed in Column A no. 3.
    - "**Other**": (creating nodes, landmarks, vista points and designs which are sensitive to the characteristics of the area): creating "landmark" and "node" is linked with nodes and landmarks under Environmental Characteristics Data (Lynch Analysis), listed in Column A no.6. Vista points are linked with important vista points again under Environmental Characteristics Data (Cullen Analysis), listed in Column A no.6. "Identity" is linked with Project Area-related Basic Data (Characteristics of the Area) listed in Column A, no. 2.

These findings, acquired during the learning process, reviewed in the context of the products emerged at the end of the learning process and briefly discussed above; indicate that the students can create a link between architectural design and urban design. When the findings of this research are evaluated in the context of learning by doing method, it is established that architecture students can carry the fundamental urban design information acquired at theoretical and implementation level to the lower scales of design.

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